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**THE VIGESIMAL SYSTEM OF ENUMERATION**

CYRUS THOMAS

As the vigesimal system is a factor of considerable importance in the study of the ancient civilization of Mexico and Central America, especially in regard to the native calendar of those regions, it is interesting to know to what extent this system of enumeration has prevailed in other parts of the world. As a step toward bringing together the data on this subject, the writer presents the following notes :

Although, as is well known, the people of Malaysia and south-eastern Asia use the decimal system, yet there are some indications that the vigesimal system was formerly in use, at least at one point, in the latter region. Aymonier discovered, by an examination of the inscriptions at Bakou and Loley in Cambodia, an account of which is published in the *Journal Asiatique* for 1883, evidence of two systems of enumeration; one of these, which appeared to be the most recent and generally used, the decimal system; the other and more ancient, the vigesimal system. The examples he gives in the original characters make this so clear as to leave no doubt on the point. There are characters for each of the nine digits, for 20 and for 100. The character for 20 is distinct, and not two tens. In order to indicate 37, there is, first, the character for 20, then for 10, and last for 7. The 40 is two twenties; 50, two twenties and ten; 60, three twenties; 80, four twenties; 98 is four twenties, ten, and eight; for 384, three hundreds, four twenties, and four. A mingling of the two systems is apparent in some of the examples given by Aymonier, but the evidence of the ancient vigesimal system is too clear and distinct to permit of doubt.

Whether further evidence on this point has been obtained from the ruins of Cambodia the writer is unable to say, as he has not had access to the most recent publications on this subject. There are, however, a few facts which indicate the use of the vigesimal system in ancient times in Malaysia or southeastern Asia, or both.

Although the Malayo-Polynesian question is still considerably tangled, it is generally admitted that both the language and

the people of Polynesia were derived from the region of Malaysia and Farther India. It is therefore legitimate to look to Polynesia for echoes of the customs of the pristine home. According to A. Featherman (*Oceano-Melanesians*), the Marquesans, although using the decimal system, denoted "twenty" by a specific word, all the rest of the numbers being "compounded from ten and twenty with a multiple unit." The Nukahivahs, of the New Marquesas group, "have specific words for the units and ten, for twenty, for forty, for four hundred, and four thousand; all the other numerals are compounded of these with the aid of ten and the units." Thus *tekau-onohuu*, 20 plus 10 equal 30; *etahi-touha*, 1 by 40; *ua-touha*, 2 by 40 equal 80; *tou-ao'*, 3 by 400 equal 1,200, etc. According to the same authority the Hawaiian system of numeration is decimal, but "progresses by forties. There are specific words for the units and ten; eleven is expressed by ten and one over; for 76 they would say 40, 20, 10, and 6, and thus the numbers are counted by forties to four hundred, for which there exists a specific word. In this manner the numbers are expressed by the addition of intervening fractional numbers as high as four thousand and four hundred thousand, each of which is denoted by a specific word."<sup>1</sup> These facts apparently indicate a primary vigesimal system. John Crawford also came to the conclusion that there was an older numeral system once in use in Polynesia.

The Maya method of enumeration was very similar to that of the Polynesian nations mentioned. The numbers from one to eleven had specific names, but from twelve to nineteen by the addition of units to ten. There was a specific name for twenty, for four hundred, and for eight thousand. The intermediate numbers from twenty to four hundred are formed mostly by twenty as the multiple, and units, though there was not entire uniformity in this respect; from four hundred to eight thousand progress was made by four hundred as the multiple; yet there is evidence in several places of the use of ten as a multiple. It is apparent, however, in the codices that the count was by units to five, and then by fives to twenty, precisely as stated by Landa.

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<sup>1</sup> See also Transactions American Ethnological Society, vol. II, 229.